REPORT OF . . .

Second annual meeting

of the

National Association

of

Nurse Anesthetists

Held at

PHILADELPHIA, PENNSYLVANIA

September 25-27, 1934

Greetings

to the

National Association of Nurse Anesthetists

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Second annual meeting

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1934-35

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"I give you the end of a golden string,
Only wind it into a ball,
It will lead you in at Heaven's gate
Built in Jerusalem's wall."

William Blake

A golden string, symbolic of the eternal quest after perfection, in literature and art, passed on from one generation to another, through the medium of the written word; each one so inspired following its luminous gleam to the Heaven's gate of their highest ideals. So it seems to me, that in a lesser degree but as real a way, this little book, symbolic of our devotion to a fine and useful work, our quest in good comradeship for its future perfection; is a golden string which as we wind it into the ball of our experience, adds beauty, value and meaning to the pattern of our lives.

AGATHA HODGINS

LIST OF REGISTRANTS

TUESDAY, SEPTEMBER 25th, 1934

9:00 A. M.

Philadelphia, Pa.

Abary, Edith	Harrisburg Hospital	Harrisburg, Pa.
Sister M. Agneta	St. Mary's Hospital	Philadelphia, Pa.
Sister M. Alaceque	St. Joseph's Hospital	Pittsburgh, Pa.
Ammenthorp, Magna	Deaconess Hospital	Grand Forks, N. Dak.
Arent, Madeline	Lawrence Hospital	Bronxville, N. Y.
Baxter, Ethel	175 So. Camilla St.,	Memphis, Tenn.
Beam, Henrietta M.	Flushing Hospital	Flushing, N. Y.
Bell, Fannie R.	St. Vincent's Hospital	Birmingham, Ala.
Bennett, E. Maye	Millville Hospital	Millville, N. J.
Berger, Olive N.	Johns Hopkins Hospital	Baltimore, Md.
Black, Minnie M.	Fortress Monroe Hospital	Fortress Monroe, Va.
Bolton, Gladys	City Hospital	Akron, Ohio.
Sister M. Borrowmea	St. Francis Hospital	Peoria, Ill.
Boswell, Florence H.	1334 Inglewood Drive	Cleveland, Ohio.
Bralley, Belva	Lying-in Hospital	Boston, Mass.
Briesch, Martha	Locust Mt. State Hospital	Shenandoah, Pa.
Brown, Mary C.	531 E. Church St.	Gainesville, Fla.
Brubaker, Marion E.	Childrens Hospital	Philadelphia, Pa.
Bryant, Laura	Cooper Hospital	Camden, N. J.
Brye, Olivia	516 Broad St.,	Newark, N. J.
Cadwallader, Marian F.	247 S. Juniper St.,	Philadelphia, Pa.
Cameron, Mae B.	Ravenswood Hospital	Chicago, Ill.
Campbell, Violet	St. Elizabeth's Hospital	Youngstown, Ohio.
Cavan, M. G.	Mercy Hospital	Wilkes-Barre, Pa.
Chesser, Willye	Easton Hospital	Easton, Pa.
Coane, Marcelene P.	Jefferson Hospital	Philadelphia, Pa.
Cole, Sylvia A.	Jefferson Hospital	Philadelphia, Pa.
Sister M. Concepta	St. Francis Hospital	Peoria, Ill.
Copeland, Vera	St. Elizabeth's Hospital	Richmond, Va.
Costello, Ella	Women's Homeo. Hosp.	Philadelphia, Pa.
Craven, Helen K.	Bellevue Hospital	New York, N. Y.
Cullen, Catherine	Arnot Ogden Hospital	Elmira, N. Y.
Dangler, Jessie M.	Dr. E. C. Hazard Hosp.	Long Branch, N. J.
Davis, Elizabeth M.	Palmerton Hospital	Palmerton, Pa.
Davis, Hester V.	Germantown Hospital	Philadelphia, Pa.
Davis, Nellie G.	1426 - 9th St., N.	St. Petersburg, Fla.
De Lone, Florence	2218 Green St.,	Harrisburg, Pa.
Derrick, Ora L.	James Walker Memorial	Wilmington, N. C.
Derwal, Lillian I.	Charleston Gen'l Hosp.	Charleston, W. Va.
Dickison, Emma B.	Chippewa Co. Memorial	Sault Ste. Marie, Mich.
Dickson, Eva M.	Brooklyn Hospital	Brooklyn, N. Y.
Digatis, Adele E.	Mt. Sinai Hospital	Philadelphia, Pa.
Donovan, Rose	Mt. Sinai Hospital	Philadelphia, Pa.

Dougan, Janet	Hamot Hospital	Erie, Pa.
Dougherty, Donna D.	Homeopathic Hospital	Wilkes-Barre, Pa.
Dunford, Estelle K.	1214 Eutaw Place,	Baltimore, Md.
Ebbs, Dorothy	Erlanger Hospital	Chattanooga, Tenn.
Emerick, Ida M.	Rochester Gen'l Hosp.	Rochester, Pa.
Estes, Mary L.	Children's Hospital	Chattanooga, Tenn.
Evon, Agnes E.	132 East 45th Street	New York, N. Y.
Farris, Marie	Jefferson Hospital	Roanoke, Va.
Fife, Gertrude L.	University Hospitals	Cleveland, O.
Fleming, Dora	5232 Chancellor St.	Philadelphia, Pa.
Fleming, Maude M.	Norfolk Protestant Hosp.	Norfolk, Va.
Francis, Louise	Clarksdale Hospital	Clarksdale, Miss.
Freese, Elsa M.	887 W. Walnut Lane	Philadelphia, Pa.
Fulton, Faye	Methodist Hospital	Philadelphia, Pa.
Gagliardi, K. F.	Lankenau Hospital	Philadelphia, Pa.
Gallagher, Marie C.	St. Mary's Hospital	Philadelphia, Pa.
Gallon, Martha	Marlboro State Hosp.	Marlboro, N. J.
Gentle, Marjorie	Wilmington Gen'l Hosp.	Wilmington, Del.
Gettinger, A.	St. Louis City Hospital	St. Louis, Mo.
Giffen, Margaret M.	Branch Ave.	Little Silver, N. J.
Giuffra, Elizabeth	Metropolitan Hospital	Philadelphia, Pa.
Glenz, Muriel M.	Minor Surgical Clinic	Hempstead, L. I., N. Y.
Gordon, Mary K.	Univ. of Penna. Hosp.	Philadelphia, Pa.
Grant, Inez	Albany Hospital	Albany, N. Y.
Guild, K. H.	846 Leader Bldg.,	Cleveland, O.
Hardin, Mary S.	Lynchburg Hospital	Lynchburg, Va.
Hill, Nathalie	Middlesex Hospital	New Brunswick, N. J.
Hitz, Leta A.	W. Reading Hospital	Reading, Pa.
Hoadley, Dorothy M.	Methodist Hospital	Fort Worth, Texas
Houck, Edna I.	State Hospital	Philipsburg, Pa.
Howard, Elizabeth W.	Womens Med. Col. Hosp.	Philadelphia, Pa.
Hug, Mildred B.	Burlington Co. Hospital	Mt. Holly, N. J.
Hunt, Alice M.	New Haven Hospital	New Haven, Conn.
Hunter, Bessie	Mt. Sinai Hospital	Philadelphia, Pa.
Hutchinson, Doris I.	Memorial Hospital	Manchester, Conn.
Jackson, D. Lucille	Jefferson Hospital	Philadelphia, Pa.
Jekel, Louise	City Hospital No. 2	St. Louis, Mo.
Jenne, Mary A.	Reading Hospital	Reading, Pa.
Jennings, Alice	Kings Daughters Hosp.	Portsmouth, Va.
John, Grace M.	New York Hospital	New York, N. Y.
Johnston, Naomi A.	Methodist Hospital	Philadelphia, Pa.
Jurick, Mary	Jewish Hospital	Philadelphia, Pa.
Sister M. Justa	St. Mary's Hospital	Philadelphia, Pa.
Kaiser, Emilie	University Hospital	Columbus, O.
Karns, Irene	McKeesport Hospital	McKeesport, Pa.
Keebler, Sarah	Jeannes Hospital	Fox Chase, Pa.
Kelley, Mary	Cooper Hospital	Camden, N. J.
Kennedy, Maud	Polyclinic Hospital	Harrisburg, Pa.
Kenney, Ellen E.	State Hospital	Connellsville, Pa.

King, Madeline	848 Park Ave.,	Meadville, Pa.
Knight, Edna	Rex Hospital	Raleigh, N. C.
Knipper, Margaret	St. Joseph's Hospital	Philadelphia, Pa.
Kornick, Boldiena A.	Jamaica Hospital	Richmond Hill, L.I., N.Y.
Lamb, Helen	Barnes Hospital	St. Louis, Mo.
Lebkuecher, Ethel M.	Decatur & Macon Hosp.	Decatur, Ill.
Leibel, Leeta	Wabash Hospital	Decatur, Ill.
Leighland, Roma	Newton Mem'l Hosp.	Newton, N. J.
Lennartz, Gertrude	St. Joseph's Hospital	Philadelphia, Pa.
Ligon, Maurine	126 S. 40th St.,	Philadelphia, Pa.
Lloyd, M. Elizabeth	Jefferson Hospital	Philadelphia, Pa.
Lockwood, Jennie M.	St. Joseph's Hospital	Philadelphia, Pa.
Long, Florence H.	Lutheran Mem'l Hospital	Chicago, Ill.
McCarthy, Genevieve G.	Chester Hospital	Chester, Pa.
McCoppin, Margaret	Sutter Hospital	Sacramento, Calif.
McCoy, Charlotte	400 W. 118th St.	New York, N. Y.
McDonald, Annie Lee	106 N. McLean	Memphis, Tenn.
McDonald, Lillian	Salem General Hospital	Salem, Ore.
McKay, Cora	Albany Hospital	Albany, N. Y.
McKean, Bertha C.	Passavant Hospital	Pittsburgh, Pa.
McLaughlin, Lucille C.	Warren Gen'l Hospital	Warren, Pa.
McMann, Josephine	Anderson Hospital	Philadelphia, Pa.
McMullen, Julia	Ellis Hospital	Schenectady, N. Y.
McTurk, Theresa A.	Metropolitan Hospital	Philadelphia, Pa.
MacCullough, Sylvia	Jewish Hospital	Philadelphia, Pa.
MacGregor, Elizabeth N.	Alexandria Hospital	Alexandria, Va.
MacNabb, Barbara Ann	Walter Reed Hospital	Washington, D. C.
Sister Mary Clare Malloy	Mercy Hospital	Muskegon, Mich.
Marberry, Eunice	Trinity Hospital	Little Rock, Ark.
Martin, Mary S.	Beyer Mem'l Hospital	Ypsilanti, Mich.
Millard, Elizabeth J.	General Hospital	Lancaster, Pa.
Miller, Helen E.	Samaritan Hospital	Brooklyn, N. Y.
Morgan, Martha A.	St. Ann's Hospital	Cleveland, O.
Morrow, G.	Fitkin Mem'l Hospital	Neptune, N. J.
Moyer, Olive S.	Lancaster Gen'l Hospital	Lancaster, Pa.
Muller, Mary H.	Duke Hospital	Durham, N. C.
Myers, Esther C.	Fitkin Mem'l Hospital	Neptune, N. J.
Myers, Margaret	Newark Eye & Ear Inf.	Newark, N. J.
Myers, Martha M.	Newark Eye & Ear Inf.	Newark, N. J.
Nash, Ruth M.	Muhlenberg Hospital	Plainfield, N. J.
Newton, Mary	Schenley Hotel	Pittsburgh, Pa.
Nichol, Mabel	Silver Cross Hospital	Joliet, Ill.
Oaks, Isabelle	Jefferson Hospital	Philadelphia, Pa.
Olmstead, Ola	The Coffey Clinic	Fort Worth, Texas
Osten, Olga	U. S. Naval Hospital	Philadelphia, Pa.
Payne, Edith	Univ. of Penna. Hospital	Philadelphia, Pa.
Payne, Minnie F.	Univ. of Va. Hospital	University, Va.
Pederson, Carin H.	N. H. Mem'l Hospital	Concord, N. H.
Plowman, Katherine	Harrisburg Hospital	Harrisburg, Pa.

Ponesmith, Sarah	York Hospital	Lemoyne, Pa.
Powell, W. S.		St. Louis, Mo.
Rapp, Elizabeth	Lankenau Hospital	Philadelphia, Pa.
Reemtsma, Freida		Weehawcken, N. J.
Rice, Verna M.	R.F.D. 1, Box 116	Mobile, Ala.
Richter, Leola	Presbyterian Hospital	Pittsburgh, Pa.
Riegel, Ruth	Frankford Hospital	Philadelphia, Pa.
Robinson, Marian L.	Pennsylvania Hospital	Philadelphia, Pa.
Rominger, Jessamine		Mt. Pocono, Pa.
Rougeux, Margaret	State Hospital	Nanticoke, Pa.
Rudkin, M.	Northampton - Accomac Mem'l Hospital	Nassawadox, Va.
Russell, M. Mabel	Jewish Hospital	Philadelphia, Pa.
Salomon, Hilda R.	Jewish Hospital	Philadelphia, Pa.
Schoch, Icie A.	United Hospital	Port Chester, N. Y.
Schwab, Florence	Temple Univ. Hospital	Philadelphia, Pa.
Scott, Georgia Cabell	Lewis-Gale Hospital	Roanoke, Va.
Shoemaker, Susan Bryce	St. James Hospital	Newark, N. J.
Short, Augusta L.	Army Hospital	Governors Island, N. Y.
Shupp, Miriam G.	Strong Mem'l Hospital	Rochester, N. Y.
Siris, Florence	Mt. Sinai Hospital	Camden, N. J.
Sisson, Daisy	St. Luke's Hospital	Bethlehem, Pa.
Slasor, Zelle	1600 Professional Bldg.	Kansas City, Mo.
Smarr, Sally O.	Protestant Episcopal	Philadelphia, Pa.
Smith, Alice C.	Jewish Hospital	Philadelphia, Pa.
Smyser, A. Pauline	Mt. Siani Hospital	Hartford, Conn.
Steffen, Gertrude	Long Island Col. Hosp.	Brooklyn, N. Y.
Stewart, Ida	Titusville Hospital	Titusville, Pa.
Strandberg, Agnes P.	94 Washington Ave.	Carteret, N. J.
Strayer, Mary C.	Conemaugh Valley Mem'l	Johnstown, Pa.
Sturgeon, Kathleen	Univ. of Mich. Hospital	Ann Arbor, Mich.
Suhihoff, Marion A.	Midwood Hospital	Brooklyn, N. Y.
Sword, Esther	Shriners Hospital	Springfield, Mass.
Sister Mary Sylvester	Good Samaritan Hosp.	Cincinnati, O.
Talcott, Marie	Lincoln Hospital	Rochelle, Ill.
Terry, Anna	Charity Hospital	Cleveland, O.
Thompson, Ora E.	Episcopal Hospital	Philadelphia, Pa.
Vichules, Gussie	Presbyterian Hospital	Philadelphia, Pa.
Vickers, Hattie	Vanderbilt Hospital	Nashville, Tenn.
Vincent, Nelle G.	Evanston Hospital	Evanston, Ill.
Wagner, Florence	Pennsylvania Hospital	Philadelphia, Pa.
Walton, Mary E.	Mercy Hospital	Pittsburgh, Pa.
Ware, Mary A.	Children's Hospital	Cincinnati, O.
Weaver, R. Edith	Hudson City Hospital	Hudson, N. Y.
Weick, Anna M.	U. S. Marine Hospital	Norfolk, Va.
Weidman, Beatrice A.	Uniontown Hospital	Uniontown, Pa.
Weisensee, Barbara	Minor Surgical Clinic	Hempstead, L. I., N. Y.
Whisler, E.	Univ. of Penna. Hospital	Philadelphia, Pa.
Whitaker, Helen	Bridgeport Hospital	Bridgeport, Conn.

Whitehead, Annette M.	402 E. Allen's Lane	Mt. Airy, Philadelphia, Pa.
Whiteman, Irene	Frankford Hospital	Philadelphia, Pa.
Willenborg, Anna	St. Joseph Hospital	Chicago, Ill.
Wright, Dorothy E.	Mt. Sinai Hospital	Philadelphia, Pa.

Second Annual Meeting

The second annual meeting of the National Association of Nurse Anesthetists opened with a luncheon at the Bellevue-Stratford Hotel, Tuesday, September 25th, Chairman, Miss Hilda R. Salomon, Chief Anesthetist, Jewish Hospital, Philadelphia. This social event was a delightful occasion, affording an opportunity for meeting old friends and making new acquaintances, one of the pleasant and advantageous phases of attendance at these gatherings.

◆

GREETING

Mrs. Theresa A. McTurk,
Metropolitan Hospital, Philadelphia, Pa.
President, Philadelphia Association of Nurse Anesthetists

Madam Chairman, and Fellow Members of the National Association of Nurse Anesthetists:

It is a privilege to be permitted to extend to you in behalf of the Philadelphia Anesthetists Association a most hearty welcome to the Quaker City, and to thank you for coming here for the annual meeting.

Occasions of this kind have a function of binding together, organizing, and unifying our profession—as important as any scientific discussion. Our society not only has remained alive but has lived; lived worthily, wrought steadily, sturdily and faithfully for the great purposes that called it into being; and now more than ever unanimity of purpose must be exacted.

Among the triumphs of medicine stand out those of Long and of Morton of the United States when they first used ether; and of Simpson of Scotland when he first used chloroform. Without a doubt the man who intentionally first gave ether for surgical purposes following reasoned out observations was Crawford W. Long, a country doctor, of Jefferson, Georgia, in 1842. He was graduated from the University of Pennsylvania in 1839. If you visit the University, ask to be shown the tablet dedicated to this pioneer.

The nurse anesthetist has worked with the surgeon with devotion that has never failed, with constancy that has never faltered, and she gives her best skill as duty calls.

Philadelphia for many years was the medical center of the United States. The first medical school in the Colonies, now the Medical School of the University of Pennsylvania, was founded here; the first almshouse and hospital in the Colonies was established here; and the first medical text-book published in America was printed here. The first training school for nurses in Philadelphia, the second to be organized in the United States, was established at the Philadelphia Hospital in 1884, with

the late Alice Fisher of England in charge, who was recommended for the appointment by the immortal Florence Nightingale.

The name of the boat upon which William Penn sailed for America, when he founded Philadelphia in 1684, was "Welcome." It is this cherished Welcome that has been characteristic of the City of Brotherly Love since its foundation that is extended to you.

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General Session, 2:00 P. M.

Greeting by Dr. Nathaniel W. Faxon, President, American Hospital Association; Director, Strong Memorial Hospital, Rochester, N. Y. (see page 13).

Address of Welcome, by Miss Mary E. Walton, President, Pennsylvania State Association of Nurse Anesthetists, Mercy Hospital, Pittsburgh, Pa. (to be published in a later issue).

"Essentials in the Training of Nurse Anesthetists," by Dr. Joseph C. Doane, Medical Director, Jewish Hospital, Philadelphia; Editor "The Modern Hospital" (to be published in a later issue).

"The Role of the Nurse Anesthetist in the Surgical Team," by Miss Anna Willenborg, Director, Post-Graduate School of Anesthesia, St. Joseph's Hospital, Chicago, Ill. (to be published in a later issue).

Business Session, 4:15 P. M.

Reports and Minutes (see page 15).

Dinner, Bellevue-Stratford Hotel, 7:00 P. M. The dinner was well attended, and again afforded an opportunity for pleasant contacts. Music was furnished for the occasion through the courtesy of the Local Arrangements Committee.

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Wednesday, September 26th

Clinic Post-Graduate Hospital, conducted by Edward Beach, M. D. —a most instructive and interesting morning.

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Hotel Normandie, 11:30 A. M. Organization meeting of the Virginia Nurse Anesthetists' Association. One of the outstanding events of the convention was the formation of the Virginia Nurse Anesthetists' Association. Miss Maude M. Fleming, Norfolk Protestant Hospital, Norfolk, Va., acted as chairman pro tem. The following officers were elected for the coming year:

President	Miss Maude M. Fleming, Norfolk Protestant Hospital, Norfolk, Va.
Vice-President	Miss Anna M. Weick, U. S. Public Health Hospital, Norfolk, Va.
Secretary-Treasurer	Mrs. Minnie Freese Payne, University of Virginia Hospital, University, Va.
Trustees:	Miss Mary S. Hardin —One year Miss Elizabeth McGregor —Two years Miss Vera G. Copeland —Three years

The meeting was enthusiastic, and the Virginia anesthetists are to be congratulated on the splendid attendance, and the interest displayed at the meeting bespeaks the building of a fine state organization.

The next annual meeting of the Virginia Nurse Anesthetists' Association will be held in conjunction with the annual meeting of the National Association of Nurse Anesthetists.

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General Session, 2:00 P. M.

"The Protective Action of Oxygen Against the Liver Necrosis Produced by the Volatile Anesthetics," by Drs. Samuel Goldschmidt, I. S. Ravdin and Baldwin Lucke, University of Pennsylvania, School of Medicine, Philadelphia (see page 25).

"The Dangers of Spinal Anesthesia," by Dr. W. Wayne Babcock, Surgical Department of Temple University, Philadelphia (see page 25).

"Avertin," by Miss Kathleen Sturgeon, University of Michigan Hospital, Ann Arbor, Mich. (to be published in a later issue).

"A Newer Method of Computing the Individual Dosage of Avertin," by Miss Alice M. Hunt, R. N., Anesthetist-in-chief, New Haven Hospital; Assistant Professor of Anesthesia, Yale University Medical School, (to be published in a later issue).

"Anoxemia," by Dr. Karl Connell (see page 30).

"The Relative Merits of Local, Colonic Ether and Avertin Anesthesia in the Neurosurgical Clinic," by Charles H. Frazier, M. D., Sc. D., F. A. C. S., Hospital of the University of Pennsylvania, Philadelphia (see page 37).

Banquet and Ball of the American Hospital Association, 7:30 P. M., Benjamin Franklin Hotel.

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Thursday, September 27th

Tour of the City, 9:00 A. M. This afforded our group an opportunity to see the interesting spots in Philadelphia.

Luncheon, Bellevue-Stratford Hotel, 12:30 noon.

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General Session, 2:00 P. M.

"Obstetrical Analgesia and Anesthesia," by Clark A. Buswell, M. D., F. A. C. S., Director School of Anesthesia, Ravenswood Hospital, Chicago, Illinois (see page 41).

"Clinical Impression of Divinyl Ether," by Miss Margaret Kramlich, Chief Anesthetist, University of Pennsylvania Hospital, Philadelphia (to be published in a later issue).

"Anesthetic Drugs and Methods Used in the Southwest," by Miss C. Virginia Godbey, Chief Anesthetist, W. I. Cook Memorial Hospital, Fort Worth, Texas.

"Clinical Experiences with Pentobarbital," by Miss Mary Lucile Goodman, University Hospitals, Cleveland, Ohio (to be published in a later issue).

Annual meeting of the Pennsylvania State Association of Nurse Anesthetists, 4:00 P. M. Following are the officers of the Pennsylvania Nurse Anesthetists' Association:

President	Miss Mary E. Walton, Mercy Hospital, Pittsburgh, Pa.
Vice-President	Miss Leola Richter, Presbyterian Hospital, Pittsburgh, Pa.
Treasurer	Miss Frances Shellenberger, Montefiore Hospital, Pittsburgh, Pa.
Secretary	Miss Mary Roenbaugh West Penn Hospital, Pittsburgh, Pa.

The annual meeting of the Pennsylvania State Association of Nurse Anesthetists will be held in conjunction with the Pennsylvania Hospital Association in May, 1935.

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The guest papers read at the meeting have been printed in this report. Due to lack of space the papers read by members of the Association will appear in a later issue.

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We appreciate the co-operation that was given us by the guest speakers who contributed so materially to the success of our second annual convention.

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GREETINGS TO THE NATIONAL ASSOCIATION OF NURSE ANESTHETISTS

By

Dr. Nathaniel W. Faxon,
President, American Hospital Association

It is a real pleasure to the American Hospital Association to have the National Association of Nurse Anesthetists meet with us. There is a real bond of sympathy and interest between hospitals and nurse anesthetists. I think it is fair to say nurse anesthetists grew up as the result of an economic demand on the part of hospitals to have on hand and available for use people ready and trained to give anesthetics. You hear a good deal of talk about whether the giving of anesthetics is practicing medicine. That has been submitted, in various states, to legal opinion; unfortunately, there has been no unanimity in the answer given. I do not think you need fear, however, even in those states where the position taken has been adverse, that it will continue to be adverse. It seems to me—and I am speaking in this instance only as an individual—that what appears to me to be an economic necessity can be answered in only one way, namely, that there is a need for nurse anesthetists and that they will be continued and that that need must be met.

In regard to problems of that kind, the American Hospital Association will be glad to help in any way that it can, either through the national organization, or through the state organizations, in supporting

the presentations of the nurse anesthetists when such presentations become necessary. The request may come either from your National Association, or it may come from your state associations, either directly to the National organization or to state or sectional hospital associations. You may feel free to call upon us to help you in any way that you may feel will be desirable.

I have looked over your program and wish that I could come and listen to all of the papers. They seem to me to be not only interesting but also very practical. Of course, every doctor feels that he, at least once upon a time, was a skilled anesthetist. When I was a house officer that was one of the principal duties of the house officer and at one time I felt that I was just as good an anesthetist as anybody there was. I wouldn't dare to attempt to give anesthetics the way they are given now; the progress that has been made fills me with fear, and the complicated instrument that you manipulate, with such ease and accuracy, excites my admiration. I have not been either on the giving or receiving end of anesthetics for some time, but I am sure that I would submit myself with great confidence to the ministrations of any registered nurse anesthetist; what I feel in that respect, I am sure must be the feeling of lay persons, who feel that they are being put to sleep, as they usually call it, by some one who knows how to do it, and the assurance that they have that they will wake up again must be a great comfort to the lay mind, as it is a comfort to the professional mind.

I wish the Nurse Anesthetists all success in their meetings here, and hope they will continue for many years to meet with the American Hospital Association.

◆

Dr. Bert W. Caldwall, Executive Secretary
American Hospital Association

It is always a pleasure, Madam President, to talk to a group of nurse anesthetists. It has been my good fortune, through twenty-five years or more that I have directed hospitals, to have employed nurse anesthetists at the majority of these hospitals. I think that you are very wise in taking action in due season by organizing yourselves into a strong national body to look after your interests, to develop the efficiency of your service, and to do those things in your line of work that will add to the safety of the patient and decrease the hazards both of the surgical service and of the anesthetic service.

You are growing now, as the work in your particular line develops, from a vocational group into a professional group. It will mean not only individual study on the part of the nurse anesthetists, but it will mean a group effort to advance your studies in the way of research, to institute new ideals of service, to develop new methods, to add not only to the total of the knowledge of anesthesia as is now possessed but also to create a new knowledge with the changing forms of the administration of different anesthetic drugs.

From a selfish as well as from an altruistic standpoint you are

interested in a strong national organization to protect yourselves from encroachment of other professions, or other vocations, which are attempting to eliminate the nurse anesthetist. If they are successful in their efforts toward this accomplishment, it will work not only a very serious personal hardship upon each of you but it will work a very great hardship upon the hospitals and upon the patients with whom you have labored so successfully and for whom you are performing such a remarkable and such a desirable service.

In your planning for the growth and development of your organization, remember this, that in the harmony of your purpose and the loyalty of your membership your strength lies, and while it is a well known privilege of women to disagree among themselves and with each other, with things as they are now constituted in your own particular purpose and the purpose of your organization you should be in agreement on all things, be tolerant and be wise and strengthen your organization, as you will strengthen it, into a national body which everyone, every profession, will respect and honor.

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MINUTES OF MEETING

(condensed)

September 25th, 1934

Philadelphia, Penna.

The Annual Business Session convened at 4:00 p. m., September 25th, 1934, with Gertrude Fife, President, presiding.

Roll Call.

The minutes of the last meeting were read by the Executive Secretary, Mrs. Florence Boswell.

Motion made by Miss Miriam Shupp, seconded by Mrs. Theresa McTurk, that minutes be approved as read. Carried.

Report of Executive Secretary, Mrs. Boswell.

Motion made by Miss Anna Willenborg, seconded by Mrs. Mae B. Cameron, to accept report as read. Carried.

Report of Treasurer, Miss Grace Edwards. Miss Edwards was not present, therefore Treasurer's report was read by former Treasurer, Miss Shupp.

Motion made by Miss Edith Abary, seconded by Miss Anna Weick, to accept report as read. Carried.

Report of Membership Committee, Miss Myrn Momeyer, Chairman, read by Mrs. Boswell.

Motion made by Miss Helen Craven, seconded by Mrs. Cameron, to accept report as read. Carried.

Report of President, Mrs. Fife.

Motion made by Mrs. Boswell, seconded by Miss Maurine Ligon, to accept report as read. Carried.

Report of Constitution and By-Laws Committee, Mrs. Boswell, Chairman.

Proposed Amendment to Article IV, Section 1, of the Constitution of the National Association of Nurse Anesthetists:

Article IV, Section 1 is hereby amended to read as follows:

"Section 1. The Board of Trustees of this Association shall consist of the President, First Vice-President and Treasurer, and five (5) members to be chosen in such manner and for such terms of office as may be prescribed in the code of By-Laws."

Motion made by Miss Verna Rice, seconded by Miss Marian Robinson, to adopt the amendment. Carried unanimously.

Proposed Amendment to Constitution of the National Association of Nurse Anesthetists.

"AMENDMENTS TO THE CONSTITUTION
"ARTICLE I.

"Section 1. A division of this Association to be known as Section of Dental Anesthesia may be created and the Board of Trustees shall be and is hereby empowered to accept applications for membership from Dental Anesthetists who shall meet all of the requirements for membership as defined herein and in the Articles of Incorporation and By-Laws of this Association.

"Section 2. Members of the Section of Dental Anesthesia may be accepted in any of the three classes defined in Section 1 of Article III of this Constitution.

"Section 3. Applicants accepted for membership in the Section of Dental Anesthesia shall pay to the Treasurer of this organization initiation fees, annual dues and any other sums levied or assessed as may be required of all other members, pursuant to Article IX of the By-Laws of this Association."

After much discussion the motion was made by Miss Mary Walton, seconded by Miss Willenborg, to refer this amendment back to the Committee for further consideration, and in the meantime to admit to active membership in the Association all dental anesthetists whose qualifications meet with the requirements for active membership under the present Constitution and By-Laws. Carried unanimously.

Proposed Amendments to By-Laws:

Section 1 of Article II of the By-Laws is hereby amended to read as follows:

"Section 1. Number of Trustees: The number of Trustees shall be eight (8) and shall be selected as follows: The President, First Vice-President and Treasurer of the Association shall be members of the Board of Trustees during their term of office and five (5) members of the Association shall be selected to membership on the Board of Trustees. One member of the first Board of Trustees shall be elected for one year, one for two years, one for three years, one for four years and one for five years. Thereafter the Trustees, excepting those serving by reason of holding the office of President or Treasurer, shall be elected for terms of three years. The President shall be chairman of the Board of Trustees."

Motion made by Mrs. Cameron, seconded by Miss Marie Farris, that amendment be accepted. Carried unanimously.

Section 3 of Article III of the By-Laws is hereby amended to read as follows:

"Section 3. No member of this Association while holding any office in this Association shall be nominated or elected to any other office of the Association.

"No officer of the Association may become a candidate for any other office of the Association unless her resignation in writing shall have been submitted to the Board of Trustees and accepted by them prior to the time such person's name is placed in nomination.

"This amendment to the By-Laws shall become effective immediately upon receiving the affirmative vote of not less than two-thirds of the members present and qualified to vote."

After much discussion, motion made by Miss Walton, seconded by Miss Willenborg, to refer this amendment back to the Committee for further consideration. Carried unanimously.

Section 4 of Article III of the By-Laws is hereby amended to read as follows:

"Section 4. Beginning with the annual election of officers in 1936 the Nominating Committee shall nominate two candidates for President. Upon counting the ballots the candidate receiving the largest number of votes shall be President and the one receiving the second largest number of votes shall be First Vice-President.

"This amendment to the By-Laws shall become effective immediately upon receiving the affirmative vote of not less than two-thirds of the members present and qualified to vote."

After much discussion, motion made by Miss Walton, seconded by Miss Willenborg, to refer this amendment back to the Committee for further consideration. Carried unanimously.

Section 5 of Article III of the By-Laws is hereby amended to read as follows:

"Section 5. The officers of this Association shall be eligible for not more than two consecutive terms except that the President and Treasurer shall be eligible for as many terms of office as they may be elected to serve by the members.

"This amendment to the By-Laws shall become effective immediately upon receiving the affirmative vote of not less than two-thirds of the members present and qualified to vote."

After much discussion, motion made by Miss Walton, seconded by Miss Willenborg, to refer this amendment back to the Committee for further consideration. Carried unanimously.

Report of the Nominating Committee, Miss Agatha C. Hodgins, Chairman. Miss Hodgins was unable to be present. Report was read by Miss Cora McKay, preceded by a letter from Miss Hodgins, dated September 14th, 1934, as follows:

"To Members of the National Association of Nurse Anesthetists:

"Madam Chairman and Members of the National Association: May I convey to you all my most friendly greetings and best wishes for a successful meeting. The keen disappointment I feel at not being able to participate in the business of this meeting is lessened by the thought that this is a representative group of those interested in the ideals of and are intensely concerned about the safe conduct of affairs of our National Association.

"You are all aware of the important bearing decisions made at this meeting will have on the future welfare of our Association. Wrong or hasty action now taken may not only wreck the good work already accomplished but defeat the accomplishment of the future programs planned and in operation for the solving of problems now confronting us and devoted to the task of building up a strong national organization. They can bring to tangible form the objectives of our Constitution.

"To this we have loyally pledged ourselves and I am asking that each and every one present keep steadily in mind our future needs, allowing no other consideration to swerve their judgment or influence their action. We must at this critical time stand together, united for what we consider the ultimate good of our association. Unless we work together as a harmonious whole we can accomplish little.

"On these premises I urge the acceptance of the candidates chosen after carefully considering the availability of all members and now proposed by the Nominating Committee, and further, that such be, if possible, elected by acclamation, in this way expressing confidence in the leadership and integrity of your governing body, the Board of Trustees.

Faithfully,
Agatha Hodgins."

The Nominating Committee made the following report:

President	Mrs. Florence H. Boswell
1st Vice-President	Miss Hilda Salomon
2nd Vice-President	Mrs. Rosalie McDonald
3rd Vice-President	Miss Cora McKay
Treasurer	Miss Lou Adams

Motion was made from the floor by Miss Robinson, that the organization continue during this critical time under the leadership of Mrs. Fife and placed Mrs. Fife's name in nomination.

Motion simultaneously seconded by several members.

Mrs. Boswell then read from the minutes of the Board meeting held May 5th, 1934:

> "The Nominating Committee asked Mrs. Fife if she would serve as President of the Association for the second year. Mrs. Fife declined the nomination. Mrs. Boswell was then asked to allow her name to be presented and Mrs. Boswell said that only with the consent of Mrs. Fife and if the Nominating Committee and Board of Trustees felt that she could be of service to the organization, she would accept such position."

Mrs. Boswell then stated that she wished to withdraw her name from nomination.

As there were no further nominations from the floor, the motion was made by Miss Walton, seconded by Mrs. McTurk, that the rules be suspended and the officers be elected by acclamation. Carried unanimously.

Officers elected by unanimous vote.

The Chair then asked for nominations for the vacancy on the Board of Trustees.

Miss Anna Willenborg nominated by Miss Hilda Salomon, seconded by Miss Shupp.

Miss Walton nominated by Miss Edith Abary.

Miss Walton declined the nomination.

Miss Madeline King moved that the nominations be closed, seconded by Miss Abary, and that the vote be cast by acclamation. Carried unanimously.

Vote carried unanimously.

Motion made by Miss Beatrice Weidman, seconded by Miss Leola Richter, that a Committee on Legislation be appointed, to be composed of three (3) members selected by the President, who shall report regularly and directly to the Board of Trustees. Motion carried unanimously.

Whereupon the President appointed Miss Hodgins to serve as Chairman, Miss Willenborg and Mrs. McTurk. Mrs. McTurk refused to accept the appointment and suggested Miss Robinson to serve in her place. The President then appointed Miss Robinson, who accepted.

Motion was made by Miss Rice, seconded by Miss Salomon, that Mr. Kenneth Guild be employed as legal adviser for the organization if found necessary by the Committee and by the Board of Trustees. Motion carried unanimously.

The Chair then asked for a discussion in regard to establishing a committee to study the possibility of National examinations for nurse anesthetists, and the standardization of schools. After much discussion, the motion was made by Miss Rice, seconded by Miss Maurine Ligon, that an Educational Committee be appointed to study and prepare a proposed curriculum for Schools of Anesthesia. A report to be made to the entire membership by this committee within six months, and periodically thereafter. Motion carried unanimously.

The Chair stated that the American Hospital Association had extended an invitation to the National Association of Nurse Anesthetists to meet with that body again in 1935.

Motion made by Miss Robinson, seconded by Miss Rice, to accept the invitation of the American Hospital Association, and to write the Trustees of the American Hospital Association that we consider it an honor and a privilege.

Motion carried unanimously.

The Chair asked for discussion in regard to the publication of report of the proceedings of the meeting, also a bulletin to be published quarterly.

Motion made by Miss Walton, seconded by Miss Rice, that the report of the meeting be published, and that the President be empowered to appoint a Committee to take charge of a bulletin to be prepared during the year 1934-35.

Motion carried unanimously.

The Chair stated that in building for the future, permanent headquarters for the organization should be considered. In her opinion the most logical place would be in Chicago, with the American Hospital Association. She felt that this should not be done, however, until such time as the Association was in a position to employ a full or part time Executive Secretary. In the meantime, as a temporary measure, and with an earnest desire to further the interests of the organization the University Hospitals of Cleveland were willing to continue under the present arrangement if the Association so desired.

Motion made by Miss Mable McNichol, seconded by Mrs. McTurk, that the organization headquarters remain at the University Hospitals of Cleveland until such time as it is possible to move to Chicago, with the American Hospital Association.

Motion carried unanimously.

Motion made by Miss Walton, seconded by Miss Weick, that the Board of Trustees of University Hospitals be sent a letter of appreciation and thanks for their contribution to the success of the National Association of Nurse Anesthetists.

Motion caried unanimously.

Miss Walton asked that all correspondence from individual members within the states where state organizations exist be sent to the state leaders in preference to direct to National headquarters.

This did not require discussion because this policy has been advocated by the National Association as well as by the state leaders, and the individuals within the states are asked to co-operate in this accepted procedure. The members at large, moreover, were urged to answer all correspondence promptly, and the point was stressed that anyone accepting appointments to committees be prepared to work.

Motion was made by Miss Robinson that the membership at large express to the officers and Board of Trustees the confidence and appreciation of the National Association of Nurse Anesthetists.

Unanimous rising vote of the membership in tribute to the services of their officers.

The Chair asked for a vote of thanks to be given to the Local Arrangements Committee, Miss Hilda Salomon, Chairman, for their splendid contribution to the success of the meeting in Philadelphia.

An unanimous rising vote with great applause.

Meeting adjourned.

Florence H. Boswell, Executive Secretary

Gertrude L. Fife, President.

REPORT OF EXECUTIVE SECRETARY

To the Members of the National Association of Nurse Anesthetists:

The membership of the National Association at the present time totals 878, including 822 active and 56 associate members.

During the year 393 notifications of acceptance were mailed to applicants who were accepted and approved—369 active and 24 associate.

All delinquent members were notified in regard to payment of dues, and membership cards were mailed to all members of the National Association whose dues were received.

Within a few weeks after the first annual meeting in September, 1933, the annual report of the meeting was edited and printed, and during the year approximately 900 copies have been distributed to members and others interested.

Orders for 242 National Association pins have been received and filled.

Programs of National and State meetings were mailed to all members of the National Association.

Application blanks were sent to 267 persons in reply to inquiries.

Including the above mentioned mailings, approximately 13,800 pieces of mail have been sent out during the year.

Questionnaires were sent to the Schools of Anesthesia regarding their curriculum. This information is available for further study by the Educational Committee.

A questionnaire was sent to all hospitals in the country, in an effort to ascertain the number of nurse anesthetists employed. Further studies are being made from the information gained from this questionnaire.

There have been held three meetings of the Board of Trustees, on September 15th, 1933; May 5th, 1934, and June 10th, 1934.

Information was sent from National headquarters to California during the trial of Miss Dagmar Nelson, in regard to the National organization and other pertinent facts. Headquarters have also been active in keeping in touch with similar situations that have developed throughout the country.

Members who might be valuable on the Educational, Legislative and various other committees have been contacted throughout the year, and we feel that we have a good working body.

Respectfully submitted,
Florence H. Boswell.

September 25th, 1934

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REPORT OF TREASURER

To the Members of the National Association of Nurse Anesthetists:

Following is the financial report for the year ending September 1st, 1934:

Cash on hand and in bank, September 1st, 1933		$1,933.81
Receipts		
Initiation Fees	$ 343.00	
Dues—National Association	1,511.50	
—State Associations	1,010.50	
Repayment on Loan to Pin Account	95.12	
Interest on Bank Deposits	55.79	
Total Receipts		$3,015.91
		$4,949.72
Disbursements		
Legal Fees	$ 581.30	
State Association Dues Transferred	467.50	
Postage	301.50	
Traveling Expense	215.65	
Publishing Annual Report	196.22	
Convention Expense	145.65	
Loan to Pin Account	112.80	
Printing and Stationery	103.34	
Stenographic Services	70.00	
Telephone and Telegraph	41.18	
Accounting Services	15.00	
Petty Cash Fund	10.00	
Miscellaneous	4.00	
Total Disbursements		$2,264.14
Cash in Bank, August 31, 1934		$2,685.58

Of the active members, 644 have paid their 1934 dues, and 178 are in arrears; of the associate list, 30 have paid their 1934 dues and 26 are still unpaid, making a total of 878 signed-up members.

When it was decided that the National Association should have a pin, a sum of money authorized by the Board of Trustees was borrowed from the national fund and a separate account opened to transact this business. The sum of $112.80 was transferred to the Pin Account, of which $95.12 has been repaid, leaving a balance of $17.68 due. However, there are 58 pins on hand, having a sales value of $43.50.

The books of the Association have been audited and certified as correct.

Respectfully submitted,
Grace M. Edwards.

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REPORT OF THE MEMBERSHIP COMMITTEE
1933-34

To the Members of the National Association of Nurse Anesthetists:
The Membership Committee held monthly meetings during the year.

The committee approved 393 applications for membership to the National Association—369 active and 24 associate. One is still pending. Three applications were rejected.

The membership to date totals 878.

In order that applications may be more quickly and accurately passed upon, we suggest that each State Association impress upon their applicants the necessity of answering each question on the application blank in detail.

Respectfully submitted,
Myrn Momeyer, Chairman.

September 25th, 1934

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REPORT OF PRESIDENT

Members of the National Association of Nurse Anesthetists:

A year ago at this time we were returning from our first annual meeting in Milwaukee. We were enthusiastic, elated over the success of our first meeting, and inspired to carry through the year of hard work ahead of us. The widespread interest that has developed in the organization since our meeting in Milwaukee has been far beyond our expectations and our fondest hopes, and it has been a constant source of pride and satisfaction to see the organization grow from day to day.

State organizations are rapidly getting under way, and it has been through the combined efforts and the splendid leadership shown by the members within the State groups that this year's progress has been made possible. The State leaders have been untiring in their endeavors to stimulate enthusiasm for State organizations, and to these women we are indeed grateful for the fine spirit displayed in their earnest desire to further the cause.

Let me take this opportunity to ask each and every member to assist their State leaders and to lighten the burden as much as possible by lending their whole-hearted co-operation to a program that will not only aid the State, but will help to further the objectives of our National Association.

In order to give you some idea of the time and effort that have been spent by individual members, let me tell you of one instance. An anesthetist in one state, in an effort to organize the state, wrote thirty-four letters by hand, and the letter you may be sure was an earnest appeal to the anesthetists to lend their support. I could give you many such examples, but suffice it to say that any association or any group that has that type of person in its midst is indeed fortunate, and with the courage displayed by the many such leaders in our group we are bound to succeed.

From the National headquarters we have made every effort possible to work out such a system that the work of the organization would be taken care of speedily and efficiently. This has been no easy task, and the demands made upon us because of the rapid growth of the organization have at times seemed overwhelming. During the year approximately

13,780 pieces of mail were sent out from National headquarters, the preparation of which required much time, to say nothing of the other details. I have estimated that thirty per cent of one's time if active in an association of this nature, is spent in organization work, and I feel that I have been conservative in this estimate. I am giving you this report, not with the idea of impressing upon you the time that has been given to the organization—because it has been gladly given—and I for one am grateful that I have had the opportunity of being of whatever service I could be to our group, but rather to give you some idea of the interest that is being taken in the organization, and to encourage each and every one of you to become active in your state. The load is never so heavy if all forces are pulling together.

In the last year, due to the economic disturbances throughout the country, certain states have witnessed a good deal of agitation against the nurse anesthetist. I want to outline to you the trouble in California. Several years ago the Attorney-General of California rendered an opinion that it was illegal for a nurse to administer an anesthetic. Many hospitals, however, continued to employ nurse anesthetists, and last year a new Attorney-General was elected who rendered a contrary opinion. Directly after this occurred a suit was entered by three doctors in California against Miss Dagmar Nelson, a nurse, who sought to prevent Miss Nelson from administering anesthetics. The case was brought to trial in July of this year, lasting twelve days. Every issue in the course of the trial was met fairly and squarely, and I quote the decision of Judge Campbell as reported in the Los Angeles Herald:

> "Acts of the defendant, under the evidence introduced in this case, do not constitute the practice of medicine or surgery under the medical practice act."

In the course of the trial information was sent from National headquarters. The report of our first annual meeting, as well as our constitution and by-laws, were used to good advantage, and it has been stated by the California anesthetists that the fact that we have a strong National organization, as well as the information sent from headquarters, benefited them in this instance.

Recently, in Indiana, the Attorney-General of that state also rendered an opinion that it was illegal for a nurse to administer an anesthetic. The outcome may be as it was in California, and again our organization should be prepared to furnish any necessary information and assistance. In my paper this afternoon I made reference to this subject, and I would refer you to it in regard to what I believe our stand should be.

When the Nominating Committee met in June my name was again presented as president of the organization. I refused the nomination, for the reason that I believe that we should establish the precedent of each year passing the office on to someone else. It has been my good fortune to have been your second President. I want to thank those who have given me their utmost co-operation this year, and I am frank in saying that it is they who have made it possible to accomplish whatever has been accomplished. I have had the co-operation of the Board of

Trustees, for which I am deeply grateful, and in leaving the office of president, let me add that it has been my pleasure and my good fortune to have come in contact with the many fine women throughout the country that the office has afforded me.

Respectfully submitted,
Gertrude L. Fife.

September 25th, 1934

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THE EFFECT OF OXYGEN IN THE PREVENTION OF THE LIVER NECROSIS PRODUCED BY VOLATILE ANESTHETICS

(Abstract of paper)

S. Goldschmidt, I. S. Ravdin and Baldwin Lucke

A comparison has been made of the relative incidence of liver necrosis in dogs anesthetized in a semi-closed system when the anesthetic was volatilized with air and when it was volatilized with oxygen. The data show that the use of oxygen with either divinyl ether or chloroform is a potent factor in the reduction of post-anesthetic liver necrosis.

When divinyl ether was used as the anesthetic by any method, liver necrosis was not observed with any degree of regularity until the anesthesia was maintained for a three-hour period. The incidence of post-anesthetic necrosis after three hours of anesthesia in a semi-closed system was nearly twice as high when the anesthetic was volatilized with air as with oxygen.

Chloroform anesthesia, on the other hand, resulted in a high incidence of liver necrosis in dogs after one hour of anesthesia. The incidence of liver necrosis following one hour of chloroform anesthesia in a semi-closed system was approximately ten times as great when the anesthetic was volatilized with air as with oxygen.

Liver degeneration has been produced in the dog following three hours of ether anesthesia when the anesthetic was volatilized with less than atmospheric pressure of oxygen, i. e., oxygen (15 per cent) and nitrogen (85 per cent).

Data demonstrating the efficacy of oxygen during anesthesia will be presented and the general implications of our findings will be discussed.

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THE DANGERS OF SPINAL ANESTHESIA

By

W. Wayne Babcock, M. D.

From the Surgical Department of Temple University, Philadelphia.

As with all anesthetics the danger of spinal anesthesia depends largely on its method of use. Differing, however, from most other forms of anesthesia, a complete dose estimated to be sufficient for the period of operation is introduced at the outset without determining the reaction of the patient to smaller doses of the drug. With inhalation anesthesia and to a degree even with local anesthesia, the induction is graduated

and the amount of anesthetic employed is estimated by noting the effects produced by the progressive introduction of the drug. With spinal anesthesia this is not the case. All of the anesthetic is injected before any anesthesia appears, and the degree and duration of the analgesia and its by-effects continue whether desirable or not, until the spinal block spontaneously terminates.

With ether or chloroform the reaction of the patient during the period of induction may show that it is unwise to produce full anesthesia; with spinal anesthesia one cannot terminate the anesthesia at any stage desired. For these reasons it is especially important that the patient be studied before the injection is made; that the patient be constantly watched during the period of analgesia, and particularly that every resource for combating untoward effects be instantly available for an emergency.

Differing from other anesthetics which may unfavorably affect persons in apparently good condition, spinal anesthesia is as a rule only dangerous for types of patients easily recognized. In a word, these are patients with markedly impaired circulatory or respiratory function. Such for example are persons unable to endure physical strain in the form of work or exercise, either from senility, extreme obesity, myocardial degeneration, or pulmonary disease seriously impairing the respiratory function. The condition may be an acute and transient one as in persons greatly depressed from shock, severe hemorrhage, or toxemia. Yet it is the patient with exhausted function rather than one acutely depressed for whom we especially fear complications under spinal anesthesia, although any person with depression needs to be handled with care.

Patients between ten and forty years of age, able to lead active lives, are good subjects for the injection. Below the age of ten, while the patient will withstand relatively large amounts of the anesthetic, the question of dosage to enable a sufficiently long period of analgesia without too intense depression involves difficulties. When, on account of the youth of the patient, the dose is halved, the duration of anesthesia will only last a quarter as long. However, in a fairly large experience with infants and young children under spinal anesthesia we have had no death directly due to the anesthetic, although in a few instances it has been necessary to use artificial respiration or other resuscitative measures.

Patients with simple hernia and subacute or early acute appendicitis as a rule withstand spinal anesthesia very well. In our service with upwards of 10,000 operations we have had no mortality from spinal anesthesia in these types. When, however, the patient has a neglected strangulated hernia with prolonged intestinal obstruction, or an advanced peritonitis from appendicitis with failing circulation, the danger of spinal anesthesia is greatly increased. Having had one death under spinal anesthesia in such a case I have for years restricted the injection to patients in fair condition. As the person under spinal anesthesia largely depends upon the movements of the diaphragm for respiration, if the diaphragm is splinted through abdominal distention, the danger of spinal anesthesia is greatly increased. Thus, late pregnancy, large ovarian

or uterine tumors, the presence of marked ascites, or abdominal obesity, seriously increases the hazard. One of our early patients with a huge uterine fibromyoma and obesity died two days after the spinal anesthesia because it took us over twenty minutes to reestablish the respiration and circulation. While, with our present supervision and experience we probably could have prevented the circulatory collapse, or at least have established cardiac contractions within the necessary limit of seven minutes, there is no question but that spinal anesthesia is dangerous for patients with abdominal distention.

Recent experiments show that the fall in blood pressure in spinal anesthesia depends chiefly upon the limitation of respiratory movement. As a result, venous blood is not drawn into the chest during inspiration, insufficient blood enters the right heart, and the heart beats slower, propels less blood, and the blood pressure falls. It is very important therefore that inspiratory movements be maintained, and the respiration while the patient is under the anesthetic should be watched as constantly as the blood pressure. Cyanosis is always ominous and should immediately be overcome. We have perhaps overstressed the importance of the blood pressure. With a patient, young and otherwise in fair condition, a systolic blood pressure of 90 or 80 does not contra-indicate spinal anesthesia. Indeed, a youth with a systolic pressure of 80 is a much better risk than an obese patient of sixty years with a systolic pressure of 180. With the higher types of spinal anesthesias a fall in blood pressure is to be expected and unless extreme, need not be combated. With a patient otherwise in good condition we rarely give any stimulation as long as the pulse may be counted at the wrist, even though the systolic pressure can no longer be recorded. On the other hand, if the general condition of the patient has not been good, a needle is introduced into a vein and sufficient weakly epinephrinized saline is introduced from time to time to maintain a systolic pressure of about 80. Thus, we have given spinal anesthesia to a patient, pulseless from internal hemorrhage, and have successfully maintained a low but distinct systolic pressure during a major abdominal operation. In such a case and for patients in intense shock, however, it is much safer to depend upon local anesthesia.

Next to the poor selection of patients for spinal anesthesia, danger comes from lack of watchful supervision. Not until we had paid nurse anesthetists were our patients under spinal anesthesia properly watched. We insist that the blood pressure be taken every five minutes in order to maintain such supervision, and that a completely equipped, intravenous tray be instantly available. Before we selected the patients for spinal anesthesia and adopted this precaution about 1 patient in 500 died on the operating table. Although nearly all of these fatalities occurred in patients in very poor condition, there was repeated delay in the use of resuscitative measures. After these two changes were adopted in 1914, ten thousand consecutive operations were done without death on the operating table or attributable to the spinal anesthetic, and since this time the mortality from other forms of anesthesia has been greater than that from the intradural injection.

The technique of spinal anesthesia appears so simple and the average patient withstands the analgesia so well that an anesthetist, trained in inhalation anesthesia, often takes the risk of the method too lightly. A limited experience has convinced him that constant watchfulness is unnecessary, that the repeated taking of the blood pressure is a waste of time, that the warnings of the operator are superfluous for one who is a highly trained specialist in anesthesia, and when the heart of the thousandth or two thousandth patient suddenly stops he has failed to note the premonitory signs or to check the onrushing catastrophe.

The one who injects the anesthetic also has a serious responsibility. If he makes the injection too forcibly or too high, with too great bulk or without due regard for the specific gravity of the anesthetic solution used in relation to that of the spinal fluid and the position of the patient, apnea may follow.

Many years ago we observed that ileus could be relieved by the intradural injection, and the method has since been advocated for certain forms of intestinal obstruction. Owing to the abdominal distention present and as a rule the poor condition of the patient, the method is a dangerous one, the use of which should be greatly restricted or abandoned.

The combination of any general anesthetic with spinal anesthesia is also dangerous. A few whiffs of ether may be beneficial in shaking a timorous, excited patient from his frenzy of fear but a complete induction with ether, gas-oxygen, or the use of narcotics to produce a basal anesthesia is done at greatly increased risk. The emesis of spinal anesthesia may occur while the patient is deeply under an inhalation anesthetic and lead the anesthetist to believe that more anesthetic is needed. The limited respiratory movements under spinal anesthesia may also greatly retard the elimination of volatile anesthetics, leading to prolonged and intense saturation of the blood.

Formerly we gave much preliminary medication to stupefy the patient before giving the lumbar injection. Now we give little.

When a patient collapses under spinal or indeed any anesthetic the first thing to determine is—does the heart continue to beat? A patient may not respire for thirty minutes and yet live; but the heart cannot stop over seven minutes with recovery. If the heart has stopped, time should not be wasted on artificial respiration. First restore the circulation and then only, the respiration.

But more important is the **prevention** of circulatory collapse. Rarely will the heart cease beating when a needle has been introduced into a vein and a very weak solution of epinephrine in saline introduced from time to time in quantities to maintain a systolic blood pressure of 80. Do not give that treacherous and dangerous drug—ephedrine. Ephedrine, as soon as there is cardiac embarrassment, turns from a stimulant to a cardiac depressant. Even a little cyanosis is enough to render the drug harmful. If one delays the intravenous injection of epinephrine until the heart no longer beats, then an intracardiac injection or cardiac massage will probably be necessary. With the circulation restored at-

tention may be given the respiration. The quickest and surest method is mouth to mouth insufflation. The mouth, held open by a gag, is covered by a towel or a few layers of gauze, the nostrils closed by the finger and thumb of one hand, the stomach compressed to prevent distention by air by the other hand. The chest should expand from each insufflation and the expiration should be audible and may be aided by compression of the thorax by the hands. Usually, but not invariably, the simple intermittent compression of the chest by the hands and forearm produces effective artificial respiration. The patient's arms should be extended at the sides of his head and the artificial respirations indicated and proved by movements of a wisp of cotton affixed to the tip of the patient's nose. Such an indicator will at times prove that the measures for artificial respiration are absolutely ineffective—a mere gesture rather than an effect.

Most centrally acting stimulants (strychnine, caffeine) used for the depression of spinal anesthesia are of little or no value. Alpha-lobeline given intravenously, however, may act despite the spinal block. For the most part epinephrine, mechanical measures, and warmth promptly applied suffice to resuscitate the patient under spinal anesthesia. The period of intense depression rarely continues or needs to be combated over ten to twenty minutes.

The secondary dangers of spinal anesthesia expressed by conditions developing hours or days after the induction are largely mythical. Late paralyses and unexplained deaths do not result from spinal anesthesia properly administered. True, a patient may have cardiac failure on the operating table with such delay in resuscitation that the cerebral cortex dies, the patient remaining unconscious, and finally dying hours or days later; but this is an indirect effect of the anesthetic. The paralysis of the muscles of the eye seen years ago and evidently due to the introduction of bacteria with the anesthetic solution are no longer recorded. Very rarely a toxic drug is accidentally introduced. I have seen two cases of paralysis due to solutions contaminated by wood alcohol. Post-anesthetic headaches are now rarely seen. The introduction of rustless steel and nickeloid needles has largely eliminated the breaking of the needle in the back.

It is evident that the danger of spinal anesthesia rests largely with the anesthetist. With ether anesthesia if the inductions are often stormy, the sequence irregular, the patients noisy from mucus and alternating between cyanosis and nausea, we do not put the blame on the ether or its manufacturer, and thus with spinal anesthesia, morbidity and mortality now reflect upon the anesthetist rather than the method or the drug.

"ANOXEMIA"

By

Dr. Karl Connell

Introduction

Anoxemia is that state of the systemic circulation wherein the blood oxygen available to sustain cell life becomes abnormally low.

Disasters during anesthesia come, not so much from toxicity of anesthetic as from deficiencies of oxygen exchange. The prevention and relief of anoxemia during anesthesia is the gravest responsibility of the anesthetist. For as surely as surgical shock may come from the rough handling and crushing of tissue, so with equal surety cell damage and general shock come from prolonged strangulation of tissue through deficient oxygen supply.

We are, all of us, a composite of countless cell colonies. Each cell burns oxygen to sustain its tiny flame of life. It absorbs that oxygen from a watery medium even as did the primordial ancestor, the water borne amoeba.

The active cells, such as nerve and muscle, draw oxygen directly from the blood stream of the encompassing capillary net work. The inactive cells, such as cartilage and tendon, draw their meager needs from the lymph flow. Brain and heart muscle cells are especially susceptible to oxygen want and sustain rapid and lasting damage by deprivation of oxygen.

The mechanism which regulates the oxygen supply of the systemic circulation is enormously complex and involves oxygen exchanges in both a watery and gaseous medium. To outline this mechanism in brief:

The consuming cell gets its oxygen from that free in the liquid plasma. This oxygen is driven into the cell under an expanding force known as tension. Free oxygen of the plasma is augmented by the oxygen bursting forth from the oxyhemoglobin of the red corpuscles to replace the free oxygen of the plasma as consumed. The blood normally loses about a third of its total oxygen in the instant before it is returned to the lung for reaeration. In the lung the red cells are reladened one molecule of oxygen to each atom of iron, by the partial oxygen pressure of the alveolar air.

In the lung cavity the oxygen exchange is all in gaseous medium and deals with diffusion between alveolar and tidal air, and with the bellows action of the lungs under the influence of the respiratory center actuated by the stimulus of successive waves of carbon dioxide in the blood stream.

Physiological adjustment to oxygen want normally has wide latitude but under anesthesia and dealing with a drugged or sick patient, the automatic mechanism is far from normal. The anesthetist is called upon to initiate many of the steps of oxygen adjustment in order to forestall and to relieve anoxemia.

To carry the patient safely we must comprehend the whole mechanism of aeration, be aware of the symptoms both of slight and grave oxygen starvation, and be prepared to institute the measures of relief.

Causes:

The usual and obvious cause of anoxemia in normal man is deficiency of oxygen gas in the lungs, either from breathing too lean an oxygen mixture or because of obstruction to tidal flow.

We live in an atmosphere 20.94% rich in oxygen, equalling at sea level 159 mm. of partial oxygen pressure. By diffusion from this mixture which we breathe as tidal air, a balance of about 13% or 98 mm. of oxygen is maintained in the alveolar air of the lungs.

If we ascend a mountain the oxygen pressure is reduced in the tidal air and is proportionally lessened in the alveolar air and blood stream. If we breathe a lean anesthetic mixture exactly the same state results. In either case signs of light anoxemia are induced, familiar to the mountain climber as mountain sickness. With greater oxygen deprivation the anesthetic disasters become equal to those of a balloonist unprotected by an oxygen respirator going into the stratosphere. As we near 13% of oxygen in anesthetic mixture the patient is on the equivalent oxygen ration as at the top of Pike's Peak. To maintain sea level oxygenation under such conditions the automatic response is to breathe faster and to speed the circulation. Therefore increase in breathing and pulse is the first clearcut symptom of slight anoxemia. In anesthesia this quickening is obscured by many other factors which accelerate pulse and breathing, such as excitement, irritation of the anesthetic and by surgical trauma. Also the picture is complicated, first by loss of carbon dioxide as a direct result of the over ventilating effect of rapid breathing, then by the fall in depth of respiration due to carbon dioxide loss. The mountain climber soon compensates to a comfortable balance of oxygen by maintaining a higher pulse and breathing rate and by gradually producing excess hemoglobin. He also compensates for a lower carbon dioxide level by diminishing the alkalinity of the blood through decrease of ammonia production and by increasing the alkaline output of the urine. In anesthesia, however, enduring for only an hour or two, these slow automatic readjustments which come to the mountain climber over a period of days, are impossible and relief from oxygen want and carbon dioxide spillage lies in the hands of the anesthetist.

The induction stage of gas anesthesia, particularly when nitrous oxide is employed, normally carries the patient into slight anoxemia. He is taken certainly to the stage of having ascended Pike's Peak, equalling 13% of oxygen in tidal air. In fact, in nitrous oxide administration we go even further into oxygen rarification, even up to the foothills of Mount Everest when employing a 9% anesthetic mixture. This is the equivalent of a partial pressure of 68 millimeters of oxygen and in anesthesia is practically an irreducible minimum. Below this tension of 9% of oxygen lies danger for the patient, a danger as real as that which confronts the mountaineer in the last ascent of Mount Everest. At 4% of oxygen, anoxemia is extreme and death is imminent. The patient is in the same atmosphere as if an oxygen mask had fallen off a balloonist above the 39,000 ft. level. Unconsciousness is a matter of four breaths and death a matter of a few minutes.

Pathology and symptoms:

The symptoms of the lighter stages of anoxemia in surgery are the same as Haldane observed in his studies on the average unacclimated person at the top of Pike's Peak, namely, acceleration of breathing and pulse, slight duskiness in the face, lips and tongue, general malaise and a sense of distress. Another symptom of particular importance, since it is often the first danger signal in the anesthetized patient, is a halt in the rhythm of the breathing, then a few fluttering breaths and another halt, possibly followed by the resumption of regular but shallow and rapid breathing. This is often noted in the slight anoxemia of surgery. Prolonged sighing or labored ineffectual expiration marks a deeper phase.

If moderate but tolerable anoxemia continues for several hours in a normal subject, it is followed by mountain sickness, headache, malaise and vomiting either immediate or on returning to lower altitude. So if the normal person is thus affected by slight and moderate anoxemia, it is unreasonable to expect the anesthetized patient to escape. In fact the pus basin is always handy for the stage of recovery.

The graver states of anoxemia fall into two classes — acute asphyxial anoxemia and that of insidious and gradual onset. The first is easily recognized and reversed, the second is often unrecognized and may cause grave and lasting damage before it becomes obvious and urgent. The acute asphyxial type is of common knowledge: a brewer enters a vat and falls unconscious, or a miner strikes a pocket of methane; he is pulled out within a minute deeply cyanosed and rigid, or if rescue is delayed four minutes and the atmosphere is completely devoid of oxygen he is a dirty grey and without pulse and with a heart muscle beating its last few intermittent strokes. Acute anoxemia induced by breath holding and by other obstruction to tidal flow is even more familiar, and is less dangerous. Anoxemia under such conditions comes on less suddenly than when oxygen is washed completely out of the alveolii by immersion in inert gas. Within our lungs we have enough oxygen quantitatively to last up to 20 seconds of breath holding without discomfort, sufficient for 40 seconds with discomfort and sufficient for 75 seconds before we drop unconscious. The pearl diver can tolerate even longer periods by training and by first inflating the lungs to capacity. In the blood itself we have scarcely any reserve free oxygen; only enough for 10 seconds of consciousness. Even in the best of health we are therefore always within four minutes of death by anoxemia. Our mass organism will tolerate only that span of complete oxygen exclusion.

In anesthesia we encounter both types of acute anoxemia, that induced by breath holding and by other equivalent respiratory obstruction, and the type of more sudden onset from washing out the lungs with an oxygen-free gas. As to the latter, it has been customary and considered safe, to induce anesthesia in an atmosphere of pure nitrous oxide. Such has been standard dental practice in inexpert hands, comparatively without mortality. We are all familiar with the loss of consciousness within three full breaths, also with the rapid onset of deep cyanosis, with the venous congestion and bulging eyeballs, with the muscular rigidity and

twitching of the tendons. None of these are toxic symptoms of nitrous oxide. They are manifestations of acute anoxemia. Any inert gas works similarly; nitrogen, carbon dioxide, hydrogen and helium—all have been tried and abandoned. Nor has nitrous oxide asphyxial induction much to recommend itself other than speed of induction, because of severe circulatory strain and imminent disaster.

Some of you were present as guest anesthetists at a clinical demonstration some years ago when one of the foremost exponents of nitrous oxide asphyxial induction carried the patient to the blue black stage. To your horror he lingered at this stage to demonstrate saturation as he termed it. The stage proved irreversible on attempting resuscitation.

Acute anoxemia is easily reversible in the early stages. Unlike anoxemia of slow onset the respiratory center has not been exhausted and the blood rapidly becomes laden with carbon dioxide to act as a respiratory stimulant. Therefore on removing the cause and by some slight reflex or mechanical assistance, such as by dragging forward the tongue or dilating the anal sphincter, the patient takes a few deep breaths, the color brightens rapidly and the storm is past, usually leaving little trace of damage.

It is far different with anoxemia of slow onset occurring in the course of surgical anesthesia. The symptoms of this type may develop so insidiously as to pass unnoticed by a careless or untrained anesthetist and the condition borders on respiratory and circulatory collapse before being recognized.

Whatever the cause and contributing factors of anoxemia of slow onset, it is usually marked by moderate rise in respiratory frequency and pulse rate. In the early stages breathing tends to deepen but this soon defeats itself, for alveolar carbon dioxide is washed out, the depth of respiration falls and a vicious circle is established. To explain this vicious circle briefly: Carbon dioxide is well recognized as the regulator of the depth of respiration; it also gives tone to venous return to the right heart and by virtue of its acid properties, permits the oxygen of the oxyhemoglobin to disassociate to the tissue cells more rapidly. Loss of this regulator by over ventilation markedly increases the gravity of anoxemia, for through loss of carbon dioxide in the blood, respiratory excursion grows more shallow, and oxygen metabolism falls further. In this vicious circle reaccumulation of carbon dioxide is tardy since oxygen metabolism is at low ebb and the respiratory center has become tired and insensitive to carbon dioxide through oxygen starvation. ' Respiration, therefore, characteristically tends to become rapid and shallow, the heart grows feeble and blood pressure falls.

With fall of blood pressure and slowing of surface circulation, the color which may have shown slightly cyanosis at onset now turns ashy grey. Respiration, in addition to being shallow and labored on expiration may come in cycles of three or four breaths with pause between. The tendons of the skeletal muscles may jerk, subsultus tendinae, best noted in the long extensors of the fingers. Collapse is now imminent and the general picture blends into that of grave surgical shock.

From oncoming surgical shock, anoxemia is to be differentiated in the early stages, largely by methods of trial and error, namely, if on supplying an abundance of oxygen the rapid pulse and respiratory rate promptly come down, color improves and the blood pressure rises, then the condition has been one of anoxemia. If additionally on increasing carbon dioxide, either by building it up through rebreathing or by administering the raw gas, depth of respiration increases, then acapnia has been a factor in the anoxemic state.

In the late stages of a prolonged and grave anoxemia such trial and error test is less reliable since all responses are slowed up by general tissue damage. Oxygen administration and carbon dioxide conservation is the life saving maneuver in grave anoxemia as in shock of surgical origin.

I have referred largely to anoxemia from the usual cause, i. e., low alveolar content of oxygen. Now, to survey other casual factors, touching on these briefly from the viewpoint of forestalling anoxemia.

The anesthetist often deals with a patient whose cells make an over demand for oxygen, such as in toxic goitre. It follows that in such patients oxygen percentage must be kept high. Extra oxygen and efficient aeration is also necessary in subjects of high fever and in those who are profoundly septic. Patients in these groups tolerate no material degree of anoxemia.

The next group for special consideration are those wherein the carrying power of the blood is diminished either by anaemia, or by defective circulation. Such subjects are susceptible to anoxemia and should be carried with such an anesthetic and with such apparatus as permit adequate oxygen in known volume.

Among that group wherein the oxygen carrying power of the blood becomes defective, we must list the victims of over ventilation which results of acapnia, i. e., a blood content abnormally depleted of carbon dioxide. Therefore if under the excitement of anesthesia or of operative trauma the bellows action of respiration is greatly stimulated, we must guard against undue loss of carbon dioxide in the expired air, by instituting rebreathing for a few minutes. For, in addition to carbon dioxide effective as regulator on depth of respiration by its balance in the alveolar air, it assists by its acid action in the blood the oxyhemoglobin to disgorge oxygen to the tissue cells. Acapnia therefore is not to be tolerated in anesthesia any more than anoxemia, for the sequel of acapnia is increasing anoxemia, and the sequel of increasing anoxemia is general shock.

The next group in which to stop, look and listen, are the victims of pulmonary disease, such as emphysema, wherein the lung wall is inelastic and the alveoli are dilated, fibrous and deficient in blood aerating surface. Tuberculous and other pneumonic processes also call for special care. But among the most troublesome of pulmonary affections is pulmonary edema. This may pre-exist as from some recent lung irritant, such as the war gases, or it may come on acutely during anesthesia as for example, of anaphylatic origin or from the struggle of acute breath-

holding, or from faulty apparatus which throws excessive breathing struggle onto the pulmonary lining.

Oxygenation of the blood through thickened and soggy endothelium of alveoli and choked bronchioles is defective indeed. Such cases call for high oxygen percentage, and for an effective non-irritating relaxant anesthetic.

The final group of contributory causes includes any air-way obstruction. As rare examples, may be cited intrathoracic obstruction as from thymus or aneurismic pressure wherein relief measures call for intratracheal intubation. Higher air-way obstruction from laryngeal spasm is more common and calls for deepened anesthesia. The common garden variety of obstruction is from collapse of soft parts of pharynx and mouth. Whatever the cause the obstruction must be relieved to prevent anoxemia. Early in my career, as surgeon in the Roosevelt Hospital, New York, there were too many blue patients and too many ether pneumonias. I went down to the engine room and flattened out a brass tube to fit the contour of mouth and pharynx and provide an open air-way through these parts. That one maneuver has probably saved more lives than my subsequent twenty years in surgery, for the pharyngeal breathing tube proved effective and met with wide acceptance.

As a closing consideration, too often a prominent factor in producing anoxemia, we should list the obstruction of anesthetic apparatus. Look over your apparatus. You should not tolerate any apparatus that has any breathing conduit less than $\frac{7}{8}$ of an inch in lumen nor any orifice of less than a $\frac{3}{4}$ inch circle. By the rule of thumb, you should sink your thumb to the first joint in any orifice of your apparatus. Also the apparatus should present resistance less than two millimeters to expiration and no appreciable resistance to inspiration.

Any obstruction to free breathing fatigues the respiratory mechanism and is potentially a contributor to anoxemia. If the anesthetist had a ruling voice there would be no leaning on the patient's chest by operating assistants nor would the high Trendelenburg position be permitted. The great surgeon is the one who is tuned to these niceties.

Effective oxygenation during anesthesia is a vital factor.

(Subsequent remarks by Dr. Connell)

Your Honorary President and myself have thought alike for many years on this subject of anesthesia and she asked me particularly if I wouldn't give you my judgment with regard to the newer methods of the carbon dioxide "filters" or soda lime absorption methods, as to their role in preventing acapnia and forestalling anoxemia. Well, up to about three years ago, I thought the machinery of absorption too cumbersome, that we could provide economy and adequate control of oxygen and carbon dioxide without all that machinery. We brought the cost of gas anesthesia down to fifty cents an hour by placing the spill valve at the end of a long expiratory conduit. It didn't seem we could economize

further in view of adding ten cents worth of soda lime granules to hourly cost. One of your members, Miss Ligon, and also Dr. Woodbridge of the Lahey Clinic in Boston, brought on a change of heart because each by their skill and my confidence in their judgment convinced me that in absorption methods we have not only economy of gases but a technic of anesthesia wherein we carry the patient in even aeration and even depth of anesthesia, lessening liability to retching and those stages of excitement and over ventilation that mean acapnia. We also have absolute control over carbon dioxide because we throw on any amount of rebreathing at any time. Most particularly was I impressed by the quiet breathing, together with the exceedingly even and accurate oxygenation of the absorption technic, and the ability to forestall anoxemia by preliminary estimate of oxygen needs. You can look at the patients and know whether you will be able to carry them to 240 or 300 c. c. a minute. You take into consideration their degree of intoxication, the degree of anaemia, the way their heart is working, the bellows action of their lungs, whether they have tuberculosis or other disease and you know in advance about what oxygen you can put them on. You also know by preliminary metabolism test if their cells are demanding more oxygen, with expectancy that you will have to run up to 320 or 350 c. c. per minute of oxygen in toxic cases. So I believe this technic gives us such a beautiful controllable anesthesia, so cheaply and with so few after effects, that gradually every hospital and every trained anesthetist will come to this method and that spinal anesthesia with its irreversible hazards, and paralysis of abdominal breathing will fade into the past.

Recently through the past three years I have approached the problem of making a better apparatus. The face mask was a problem, a durable boilable rugged mask. I think I have a good one, about as tight and as universal in fit as any war mask we ever used; also under the inspiration of Dr. Woodbridge I have designed an apparatus that presents practically no obstruction, in which the valves move easily and which is exceedingly accurate. If it in itself doesn't help toward better anesthesia by wide adoption, at least it will stimulate defective types toward betterment.

So to summarize: In anoxemia we are approaching possibly the most delicate and one of the most important subjects in anesthesia, a subject that is even more important, from the standpoint of the patient's welfare than is the anesthetic itself. The nurse trained in anesthesia, I have always trusted and employed in my own surgery when available, finding in her when equally trained and with the same degree of intelligence as the male, a watchful attention and an intuitive judgment that oftentimes the graduate physician with his multitudinous other cares does not equal. The mechanism of oxygenation, the causes, symptoms and relief of anoxemia must be her special concern.

THE RELATIVE MERITS OF LOCAL COLONIC ETHER AND AVERTIN ANESTHESIA

By
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Madam Chairman, Members of the Association: First of all I want to express my appreciation at the invitation to address you. I consider it a very great compliment. What I would have done without the aid of the nurse anesthetists in the last fifteen or twenty years I really don't know. I am quite sure my life has been prolonged many years and I have had many hours of peace where I otherwise would have had anxiety and worry. You might be interested in this as a matter of history: I think, if I remember rightly, that Dr. Crile was the first to engage a nurse anesthetist, and on my return from a visit to Cleveland I appeared before the Board of Managers of the University Hospital and told them I wanted to engage a nurse anesthetist. I could see cold shivers going up and down the backs of the members of the Board of Managers as they pictured to themselves damage suits, and they said, "No, we couldn't think of it, unless you get the opinion of the counsel for the hospital." I said I would, and I consulted the ablest lawyer in Philadelphia. The first question he asked me was, "What is your motive for engaging a nurse anesthetizer?" I said, "Only one, to save human lives." He said, "I don't want to ask you any more questions. That will do." He dismissed me and sent his report to the hospital, and the hospital gave me permission to engage an anesthetizer at our clinic, which I think was almost the second or a very close second at least in the United States. It was very fortunate for me that I selected a woman who seemed to take to anesthesia like a duck to water, because with very little training and very little difficulty she was able to master the problems of anesthesia in my clinic.

I must be very brief in my remarks because your time is limited. Going back over my clinical experience, I might divide the history of anesthesia in my neurosurgical clinic into four periods. I began with ether by inhalation. We soon found there were many objections to ether in neurosurgical operations. In the case of brain tumors, there is a particular objection to ether. There is no doubt at all that ether by inhalation does increase brain volume and, when as with brain tumor, there is already a decided increase in intracranial pressure, to increase that by the administration of ether hampers and handicaps the operator to a considerable degree.

Secondly, I am sure there is more venous bleeding under ether anesthesia by inhalation than there is with other methods, and, thirdly, there is more post-operative vomiting under ether by inhalation than under the anesthetics we have used more recently. Of course, in intracranial operations, to have the patient vomit persistently or frequently after operation is a very serious matter, because there is always the probability that it may excite or induce a post-operative hemorrhage.

So we came to the conclusion we would abandon ether and that led us into the second period, the period of local anesthesia. Local anesthesia is almost the ideal anesthetic for neurosurgical procedures. It is a simple matter to desensitize all the tissues, the scalp, the skull, the meninges and so on, so that the operation can be conducted painlessly, even in young children. We have done many intracranial explorations in children under local anesthesia, without any difficulty at all.

But there is one great objection to local anesthesia in the neurosurgical clinic; it is not a very humane procedure. After the patient has been lying on the table for an hour and a half, or two hours or longer, he becomes exhausted, if not physically, at least nervously, and there develops what I have often called psychic shock. The blood pressure goes down, the pulse goes up and the patient's condition becomes alarming. This often is not due to the nature of operation, but rather to exhaustion of the nervous system and we have found under such circumstances that a very little ether by inhalation—what we used to call the "ether nap," would be most effective in dissipating this picture of psychic shock or whatever you choose to call it; as soon as the patient would take about half an ounce of ether the pulse would go down and the blood pressure return to normal.

I had a very amusing experience with a patient who had what I call "psychic shock." The patient, a physician, was put on the operating table, and as I began to prepare the field of operation, glancing on the blackboard where we keep our blood pressure observations, I saw his systolic pressure was 70. I said, "Well, that can't last very long, it must come back to normal within a few moments." I went on with the scalp incision, and prepared for the osteoplastic flap, when I found the blood pressure had dropped to 60. I decided to go no further. I closed the wound and sent the patient back to his room. The following day I happened to hear of a conversation between him and the orderly. The morning of operation a substitute orderly from the medical ward had been assigned to prepare the patient for operation. The patient said to the orderly, "What do you know about these operations anyway?" "Well," he replied, "I don't know much about them; the only fellow I know who was operated on died," and with that introduction, the patient came to the operating room with a systolic pressure of 70 and it took him about a week to recover from this psychic shock.

We have serious objections to ether by inhalation. We have much satisfaction in the use of local anesthesia; the principal objection to it being that the patient becomes nervously exhausted and fatigued.

Then came the third period, the period of colonic ether anesthesia. Now, those of you who know the history of anesthesia remember that colonic ether anesthesia has had rather a peculiar experience. It started away back in the middle of the last century and has had its ups and downs ever since; it was taken up by this man and then dropped, then by another man and again dropped. I took it up in a case, in which we were attempting a cranial exploration for tumor; the patient reacted very badly to ether by inhalation. My anesthetizer asked me whether she could try colonic ether. I said, "If you want to, go ahead." And so,

in a few days, we brought the patient back to the operating room under colonic ether anesthesia and the experience was so satisfactory that we continued to use it for a number of months until altogether we had some 270 patients. I have no objection whatsoever to colonic anesthesia, given as it was by my anesthetizer; it seemed to be almost ideal from every standpoint, except possibly one; the period of induction was too long, longer for example than in avertin anesthesia. The patient was sent to the anesthetizing room almost an hour before the time scheduled for the operation. But with this one exception, colonic ether anesthesia in my experience is absolutely perfect for neurosurgical procedures.

And, in summarizing my experience, I once wrote: "We have a method of producing narcosis in colonic ether anesthesia in which there is no sense of suffocation, no period of excitement, no harmful effects upon the pulse or blood pressure, no irritation of the air passages, a state of analgesia after consciousness has returned, a narcosis of uniform depth, the ether vapor is always warm, there is less post-operative nausea and vomiting, the amount of drug in the system is fixed, and the absorption of the drug can only be at a given rate"—no matter how much you put in the bowel at a given time, you know that colonic ether can only be absorbed at possibly an ounce or two every hour, so that there is no danger of an overdose. The routine dose was one ounce of 65 per cent ether oil for each twenty pounds of body weight.

Not very long after we began to use colonic ether avertin was introduced and this leads to the fourth period. Up to a year ago we had used avertin in something like four hundred and thirty cases. You have already heard so much about avertin there is not much for me to say, except that we think there are certain bugaboos about the drug that shouldn't alarm us. We are not alarmed by the transitory fall in blood pressure, which happens in many cases, perhaps twenty points in the first twenty minutes after the anesthetic is administered. We have not been alarmed by any of the rumors of liver intoxication. In fact, we have never seen any evidence of liver intoxication. We are not alarmed by any evidence of renal damage because, as you know, the drug is first transformed in the liver. We have not noticed any alarming effect upon the respiratory functions, and for that reason it seems to us especially desirable in tumor explorations when irregular respiratory rates or labored breathing would be embarrassing to the surgeon.

We do not believe that avertin should be used for deep anesthesia; it should be used as a basic anesthetic and combined with local anesthesia. It produces a tranquil state and, if used in moderate dosages—and as time goes on we are using a smaller rather than a larger dose—we find it is robbed of its possible harmful or alarming effects. The dosage we are using varies between 60 and 100 milligrams.

Let me summarize, if I may, my comparison between these two methods, that is, colonic ether and avertin. For this purpose we compared one hundred consecutive cases of colonic ether with one hundred consecutive cases of avertin. It remains, therefore, only to deliver our

verdict as to which of these two administered anesthetic agencies should be given preference.

If, in the final analysis, the decision rested altogether on the factor of safety, there would be no choice. So far as I know, colonic ether anesthesia does not cause an increase of intracranial pressure; certainly avertin does not. The preparation of the patient and preliminary medication are practically identical. The post-operative complications, such as vomiting, are not related by us to either drug. Of course, after a good many cerebral explorations we may have vomiting, especially cerebellar explorations. Vomiting is of central origin and has nothing to do with the anesthetic.

Pneumonia is not a factor to be considered in either drug. It has been my belief that post-operative pneumonia has nothing to do with the anesthetic; at least it has had nothing to do with the anesthesias in the surgical clinic at University Hospital. We have analyzed our cases now for almost fifteen years and compared the percentage of post-operative pneumonias that developed after operations under spinal anesthesia, under local, under avertin, under ether by inhalation, under colonic ether, under nitrous oxide, and the incidence is exactly the same, no matter what the anesthetic used. Those of you who will look into the matter more carefully will find, I think, that post-operative pneumonia is a seasonal complication and if you make your graphs for the year you will find that post-operative pneumonia is more prevalent in the months of the year when infections of the upper respiratory tract are more prevalent. There is but little of it in the summer months and not much in the fall; but beginning in December, and on in January and February, the peak will be reached in March. So post-operative pneumonia should not be charged to avertin or to nitrous oxide or to any other anesthetic.

If there is any outstanding difference between avertin and colonic ether it is this—the induction period of avertin is shorter. This, of course, other things being equal, gives to avertin a decisive advantage. On the other hand, the duration of the anesthesia period is longer under colonic ether than it is under avertin. For this reason in avertin anesthesia it is more frequently necessary to give the patient a sedative before the conclusion of the operation than it is under colonic ether and, in some cases, even to close the wound under ether by inhalation.

That, very briefly and in a very few words, represents my experiences with these three methods, that is, local anesthesia, colonic ether and avertin. If I had to express a preference for avertin or colonic anesthesia I wouldn't know exactly how to cast my vote; colonic ether anesthesia takes a little too long to induce and avertin anesthesia, in the dose we give, doesn't last quite long enough. You must remember that in the neurosurgical clinic the operations may last two, three, four, or sometimes five hours. However, when the effect of the avertin wears off, as it will owing to the longer operations, the patient may be kept quiet with sedatives.

"OBSTETRICAL ANALGESIA AND ANESTHESIA WITH SPECIAL EMPHASIS ON GAS ANESTHESIA."

By

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Madam Chairman and Members of the Nurse Anesthetists' Association:

I am just going to say a word of encouragement before presenting my paper. I notice that some of you are very much agitated as to your professional future. I am an optimist in that respect; I believe that you need not worry about it. I think it is a problem that will solve itself, because you are making your anesthetics so much superior to anything else that has been given that there will be a demand for them, and the surgeons will insist upon that kind of anesthesia, or better. With an organization of this kind you are going to progress and improve.

Even though some of the states do pass laws against nurse anesthetists, it will be found that they are essential in performing the routine work. The number of doctors who wish to give anesthetics is small and insufficient to fill the need. They will superintend the work, fulfilling the letter of the law, but the burden will still fall upon the nurse anesthetist.

There is a large turnover among nurse anesthetists because individuals are constantly leaving the profession for other fields of activity. Their places must be filled by those coming from schools teaching anesthesia.

It has been our experience at Ravenswood Hospital that, until the last two or three years, we were unable to fill the demand for nurse anesthetists. During the depression we had a few more nurses than we had places for, but the demand this year has been greater than the supply on hand, a very encouraging feature. I am sure that our schools of anesthesia are doing a great work in teaching nurses who can give anesthetics better than anybody else. I think it is a field suited to women, just as nursing is, and you can do this work a great deal better than men can.

Now with regard to the paper today: When I was invited to come to Philadelphia, I was at a loss to know just what to say. I did not want to say anything so unnecessarily scientific that it would bore you; I did not want to say anything that would not be practical, but I felt that we could improve this field of anesthesia and all profit by it because I know of no greater duty of the obstetrician than to relieve pain, and one who spares a mother the suffering, the horror and nervousness of parturition should, in the hereafter, be crowned with diadems and given a reserved place at St. Peter's right hand.

In reviewing the literature on relief of pain in childbirth, we find it filled with reports of various methods, numberless remedies, used for this purpose. Passing over the barbaric ages, we come to more civilized times when, with the discovery and use of ether and chloroform, fair results were obtained. Later, besides gas anesthetics, were introduced narcotics and hypnotics, nerve sedatives, and now the barbitals. These latter, as all

of you know, are used in various combinations and, we may say, if in skillful hands, with excellent results. It is needless to bore you with details but is enough to say that we have many reports of their good results, and sometimes of bad results, in this country as well as abroad.

Yet experimentation is continuing, and we sincerely hope that before long the problem will be solved and we shall have one remedy, or one combination of remedies, to take the place of this conglomeration, for it is self-evident that, when so many remedies have been offered for the same purpose, no one of them is perfect.

It is the purpose of this paper, therefore, to stimulate in the professional anesthetist a more careful study of the subject, and a more effective administration of the remedies at hand.

We, at Ravenswood Hospital, sincerely believe that gas analgesia and anesthesia comes the nearest to solving this problem of any remedy at hand, and that it does so with the minimum amount of danger to the mother and baby. It is necessary not only for the anesthetist to be well trained in the general technic of anesthesia and familiar with the administration of the gas selected but also for her to know the fundamental physiology of labor, that is, in particular, the mechanism of the three stages. Then, if she will use her talent with sufficient interest, she will get the desired results. This is no place for a mechanical routine to be applied without variation.

Also, the anesthetist should cooperate with the obstetrician in charge in the best way possible. She should have an understanding with him as to just what he desires; at the same time, this would give her an opportunity to make a few modest suggestions, if necessary, in such a way that they should be well received.

In the selection of agent, there is a choice between nitrous oxid and ethylene, in various combinations with oxygen and ether. Nitrous oxid is less explosive than ethylene, but does not give as complete relaxation and is slower in action. But perhaps, in many hands, it is the safer. Either is efficient, however, for obstetrical analgesia and anesthesia.

A third gas of choice, cyclopropane, is now well along in the experimental stage and may soon be available for use. A few remarks about this new gas might be appropriate before taking up the subject of technic.

Cyclopropane is a hydrocarbon gas, its formula being C_3H_6, that is, three atoms of carbon attached to six atoms of hydrogen.

It was first made by Freud in 1882, and it is heavier than air, and settles to the floor when spilled into the atmosphere, the same as ether, rather than float as does ethylene.

Henderson and Lucas, who have done some very valuable experimental work on the explosiveness of cyclopropane, report the following:

Percentage Mixtures:

Oxygen	20%	)No
Cyclopropane	80%	)Explosion

Oxygen	25%	No
Cyclopropane	75%	Explosion
Oxygen	29%	Moderately
Cyclopropane	71%	Explosive
Oxygen	34%	Very
Cyclopropane	66%	Explosive
Oxygen	73%	Very
Cyclopropane	27%	Explosive
Oxygen	75%	Moderately
Cyclopropane	25%	Explosive
Oxygen	80%	Very Mildly
Cyclopropane	20%	Explosive
Oxygen	81%	No
Cyclopropane	19%	Explosion

Cyclopropane is a compressible gas, and, when compressed, has no known chemical changes. This means that an ordinary "B" size cylinder used for anesthetic gas can thus be made to contain fifty gallons of the gas, with a pressure of about seventy-five pounds to the square inch, as compared with several hundred pounds of the commoner anesthetic gases.

The process of manufacture and purification has been developed by Wardell of the Ohio Chemical Company, to whom we are indebted for the present supply. It was through his experiments, together with those of Henderson and Lucas, that it was offered to Dr. Waters of the University of Wisconsin for clinical observations, and after 450 cases he reports the following summary: Summary and Conclusions—The gas has been found satisfactory as an anesthetic agent, particularly since adequate muscular relaxation is obtained with concentrations of less than 20% in oxygen. Observations and laboratory experimentations show it to have no more effect on vital function than anesthetics now in use.

The technic of administration has been found to differ somewhat from other agents and the signs of anesthesia are not completely in accord.

Post-operative complications compare favorably with other agents under similar conditions.

The gas has no undesirable physical properties, and although explosive, is less so than ethylene.

For the above data on cyclopropane, I am indebted to the Ohio Chemical Company and Dr. Waters, and have purposely omitted the technic of administration, since I do believe it should not be used by the nurse anesthetist until further experience has been published and technic simplified.

The equipment required for giving analgesia and anesthesia in the delivery room is the same as that used in the operating room. There should be a gas machine loaded with cylinders of oxygen, carbon dioxid,

ether, and nitrous oxid or ethylene, or both. Also, a very helpful aid is a mirror placed on a standard at the foot of the delivery table at such an angle that the progress of the labor can be reflected by it to the anesthetist.

The technic of administration is simple. First, the patient should be instructed as to what is to be done and the part she must take in the proceedings. This cooperation is most important for good results. She must inform the anesthetist of the beginning of the contraction and follow her instructions as to inspiration of the gas. When the signal is given by the patient, the mask is applied with the machine set for the desired mixture and the patient is instructed to take the desired number of inhalations to produce analgesia before the climax of the pain cycle is reached. When the contraction ceases, she is directed to relax and rest until the next cycle, at which time the same procedure is repeated. This is continued as long as analgesia is required.

When the time comes for the patient to bear down and work, best results are obtained if the directions are given by the anesthetist, and with the permission of the obstetrician for this, no effort is lost. Near the close of the second stage of labor, when anesthesia is required, a stronger mixture may be given, or a more continuous administration. After the head has been delivered, oxygen should be given without the anesthetic, to assist in the resuscitation of the baby. If repair is necessary, surgical anesthesia can be administered in the usual way.

For the benefit of those who may be in doubt as to the percentage of the gas mixture that should be used, I might say that we find the following to be very serviceable: For analgesia, ethylene or nitrous oxid, 60 to 70 per cent, oxygen 40 to 30 per cent; for anesthesia, ethylene or nitrous oxid 95 to 90 per cent, oxygen 5 to 10 per cent.

In commenting on the above technic, let me say that obstetricians disagree as to when the analgesia should begin and also as to the time when the patient should be instructed to work or bear down with the cycle of pain. Since we are giving analgesia for the relief of suffering and it can be given for long periods without danger, we believe there is no harm in giving it when the pain is severe enough to warrant relief, whether it is in the first or second stage of labor. The patient should not be directed to work or bear down, however, until she has shown signs of doing so involuntarily. This time is usually reached in the latter part of the first stage.

The analgesia state furnishes an excellent field for suggestion; just as does hypnotism. That is why it is possible to direct labor easily in analgesia. For this reason, preanesthetic sedatives should not be given, as they will cause clouding of the analgesic period. The ideal objective is a normal physiological labor without pain.

This method of procedure will transform the process of delivery from the old-fashioned football cheer-leader style, with many assistants wildly participating, to a quiet, dignified labor, with the anesthetist directing the work under the advice of the obstetrician. The contrast is marked.

In reviewing the work at Ravenswood Hospital, under the excellent supervision of our Chief Anesthetist, Mrs. Mae B. Cameron, we find that from January 1, 1924, to June 1, 1934, we have given 7,332 obstetrical anesthesias.

From 1924 to 1927 drop ether analgesia was the principal method of choice, with gas analgesia optional. In 1927 gas analgesia and anesthesia was added as a routine service in the Obstetrical Department. In 1928 the number of drop ether administrations was reduced to 18 with 654 of nitrous oxid and oxygen, and 259 of nitrous oxid, oxygen and ether.

During the last two and one-half years, we have had but one administration of drop ether; none of chloroform and drop ether; none of chloroform alone; nor of nitrous oxid, oxygen and drop ether. It is especially interesting to note that we have given only four rectal analgesias throughout the entire period.

These figures will illustrate to you how easy it is for gas analgesia and anesthesia to take the place of the many methods that are now in use. If the gas is applied properly, it will sell itself. I, therefore, implore of you, as gas anesthetists, to give more attention to this subject, and to endeavor to help solve this problem. Our experience has been that the mothers have praised it highly, the doctors are recommending it, and the hospital has benefited by the increased number of maternity cases.

Kind and Number of Obstetrical Anesthesias Given from January 1, 1924, to June 1, 1934.

Date	N20 XO	N20 XO XE	DE	Chlo XDE	Chlo	N20 XO XDE
1924	50	17	112	2	5	1
1925	67	12	108	3	9	2
1926	160	40	138	0	1	9
1927	298	99	374	0	3	21
1928	654	259	18	1	0	1
1929	814	193	5	0	0	2
1930	761	262	4	0	1	1
1931	632	227	0	0	1	1
1932	444	258	0	0	0	0
1933	464	278	1	0	0	0
1934	196	164	0	0	0	0
Total	4540	1809	760	6	20	38

Cæsareans						Rectal		
N20 XO XE	N20 XO XDE	DE	Loc	Ethyl XO	Ethyl XOXE	XN20	Ethyl	Total
3	1	0	0	0	0	0	0	191
13	0	3	0	0	0	0	0	217
9	0	0	1	0	0	0	0	358
0	0	0	0	4	4	0	4	807
0	0	0	0	5	6	0	5	949
0	0	0	0	11	3	0	5	1033
0	0	1	0	6	8	0	8	1052
0	0	0	0	7	3	0	6	877
0	0	0	0	6	10	3	1	722
0	0	0	0	9	4	0	3	759
0	0	0	0	4	2	1	0	367
23	1	4	1	52	40	4	32	7332

I am going to tell you just a little experience we had. We had been endeavoring for some time to introduce gas analgesia into the obstetrical department, but our obstetricians were hesitant because at that time there were so many reports of explosions from its use over the country. As we had a number of obstetricians on our staff and a variety of methods, it was necessary to feel our way along, so I arranged with five or six of my friends among the staff who wanted gas anesthesia that they should ask for it. We prepared to give it, and had our rooms prepared for it and then told them that we were ready. Without any announcement to the staff or to any of the committees, these men when they came to the hospital, requested that gas analgesia be given, and they were accommodated. Nothing at all was said to the patients, no advertising feature was made of it, but the patients themselves advertised it. It was not long until they were whispering to one another, "Well, did you get the new gas?" They called it the "new gas"; of course it was nothing more than nitrous oxid but it was a new application to them. It was not long before all the doctors found that they had to give gas analgesia in obstetrics.

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◆

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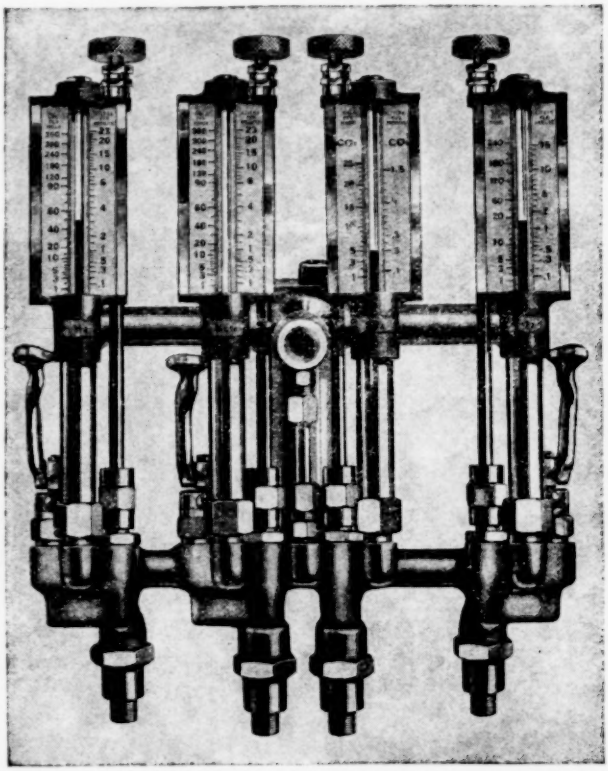

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